



## SCIENCE AND TECHNOLOGY POLICY OFFICE

### Request for Information: Sustainable Chemistry

**AGENCY:** Office of Science and Technology Policy (OSTP).

**ACTION:** Notice of Request for Information (RFI) from the Public on Federal Programs and Activities in Support of Sustainable Chemistry.

**SUMMARY:** The Office of Science and Technology Policy (OSTP) requests input from interested parties on sustainable chemistry to guide future Federal efforts. The term “sustainable chemistry” does not have a consensus definition and most uses of the term indicate that it is synonymous with “green chemistry.” Therefore, information is requested on the preferred definition for sustainable chemistry. OSTP requests comments on how the definition of sustainable chemistry could impact the following: the role of technology, Federal policies that may aid or hinder sustainable chemistry initiatives, future research to advance sustainable chemistry, financial and economic considerations, and Federal agency efforts. Comments provided in response to this RFI will be used to address Subtitle E – Sustainable Chemistry of the 2021 National Defense Authorization Act (NDAA) to identify research questions and priorities to promote transformational progress in improving the sustainability of the chemical sciences.

**DATES:** Interested persons and organizations are invited to submit comments on or before 5:00 p.m. ET on [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Interested individuals and organizations should submit comments electronically to [JEEP@ostp.eop.gov](mailto:JEEP@ostp.eop.gov) and include “Sustainable Chemistry RFI” in the subject line of the email. Due to time constraints, mailed paper submissions will not be accepted, and electronic submissions received after the deadline may not be taken into consideration.

*Instructions:*

Response to this RFI is voluntary. Each responding entity (individual or organization) is requested to submit only one response. OSTP welcomes any responses to inform and guide policies and actions related to Sustainable Chemistry. Please feel free to respond to one or as many topics as you choose, while noting the number of the topic(s) to which you are responding. Submission must not exceed 10 pages in 12-point or larger font, with a page number provided on each page. Responses should include the name of the person(s) or organization(s) filing the comment, as well as the respondent type (e.g., academic institution, advocacy group, professional society, community-based organization, industry, member of the public, government, other). Respondent's role in the organization may also be provided (e.g., researcher, administrator, student, program manager, journalist) on a voluntary basis. Comments containing references, studies, research, and other empirical data that are not widely published should include copies or electronic links of the referenced materials. No business proprietary information, copyrighted information, or personally identifiable information should be submitted in response to this RFI. Please be aware that comments submitted in response to this RFI, including the submitter's identification (as noted above), may be posted on OSTP's website or otherwise released publicly.

In accordance with Federal Acquisitions Regulations Systems 15.202(3), responses to this notice are not offers and cannot be accepted by the Federal Government to form a binding contract. Additionally, those submitting responses are solely responsible for all expenses associated with response preparation.

**FOR FURTHER INFORMATION CONTACT:** For additional information, please direct questions to Melanie Buser at [JEEP@ostp.eop.gov](mailto:JEEP@ostp.eop.gov) or 202-456-4444.

## SUPPLEMENTARY INFORMATION:

**Background:** The term “sustainable chemistry” does not have a consensus definition and most uses of the term indicate that it is synonymous with “green chemistry.” Publications and legislation have typically treated sustainable chemistry and green chemistry synonymously.<sup>1,2</sup> However, green chemistry has traditionally focused on hazardous substances, while sustainable chemistry has been used in the context of both hazardous and non-hazardous substances. An example is the EPA definition:

*“Green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. Green chemistry applies across the life cycle of a chemical product, including its design, manufacture, use, and ultimate disposal. Green chemistry is also known as sustainable chemistry.”<sup>3</sup>*

In 2017, Congress used the term “sustainable chemistry” and included expanded concepts such as pollution prevention, reducing risk, efficient manufacturing, and to “*promote efficient use of resources in developing new materials, processes, and technologies that support viable long-term solutions to a significant number of challenges.*”<sup>4</sup>

The Organization for Economic Cooperation and Development (OECD) considers a much broader definition that incorporates efficiency in use of natural resources: “*Sustainable chemistry is a scientific concept that seeks to improve the efficiency with which natural resources are used to meet human needs for chemical products and services. Sustainable*

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<sup>1</sup> See, for example: H. Rept 108-462, “Green Chemistry Research and Development Act of 2004” H. Rept. 108-462 - GREEN CHEMISTRY RESEARCH AND DEVELOPMENT ACT OF 2004 | Congress.gov | Library of Congress

<sup>2</sup> Public Law No: 111-358 (01/04/2011) which uses both terms independently and combined <https://www.congress.gov/bill/111th-congress/house-bill/5116/text?overview=closed&r=12>

<sup>3</sup> <https://www.epa.gov/greenchemistry/basics-green-chemistry>

<sup>4</sup> Public Law 114-329, SEC 114 (a) (2) approved on January 6, 2017, <https://www.govinfo.gov/content/pkg/PLAW-114publ329/pdf/PLAW-114publ329.pdf>

*chemistry encompasses the design, manufacture and use of efficient, effective, safe and more environmentally benign chemical products and processes."*<sup>5</sup>

In early 2018, the Government Accountability Office (GAO) published GAO-18-307, titled Chemical Innovation: Technologies to Make Processes and Products More Sustainable, that equated “green chemistry” with “sustainable chemistry” and found that participating stakeholders lacked agreement on how to define, measure, or assess the sustainability of chemical processes and products. The GAO did find, however, that there were several common themes underlying what sustainable chemistry strives to achieve:

- improve the efficiency with which natural resources—including energy, water, and materials—are used to meet human needs for chemical products while avoiding environmental harm;
- reduce or eliminate the use or generation of hazardous substances in the design, manufacture, and use of chemical products;
- protect and benefit the economy, people, and the environment using innovative chemical transformations;
- consider all life-cycle stages including manufacture, use, and disposal when evaluating the environmental impact of a product; and
- minimize the use of non-renewable resources.<sup>6</sup>

OSTP has been tasked under Subtitle E – Sustainable Chemistry of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (Public Law 116-283)<sup>7</sup> with creating a consensus definition for the term “sustainable chemistry” to coordinate Federal programs and activities in support of sustainable chemistry. The definition, for which we are seeking comment, will inform OSTP’s development of a

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<sup>5</sup> <https://www.oecd.org/chemicalsafety/risk-management/sustainablechemistry.htm>

<sup>6</sup> <https://www.gao.gov/assets/gao-18-307.pdf>

<sup>7</sup> <https://www.congress.gov/116/plaws/publ283/PLAW-116publ283.pdf>

framework of attributes characterizing sustainable chemistry as well as quantitative assessment metrics. Additionally, it will allow OSTP to assess the state of sustainable chemistry in the United States; coordinate and support Federal research, development, demonstration, technology transfer, commercialization, education, and support for public-private partnerships; identify Federal barriers and opportunities; identify scientific challenges; avoid duplication; and position Federal funding for maximal impact including through synergistic partnerships.

***Scope:*** OSTP invites input from any interested stakeholders, including industry and industry association groups; civil society and advocacy groups; local organizers and community groups; state, local, and tribal governments; academic researchers; technical practitioners specializing in chemistry and chemical processes; and members of the public, representing all backgrounds and perspectives. OSTP has great interest in receiving input from parties developing sustainable chemistry technologies, parties acquiring and using such technologies, and people from communities impacted by their use, including but not limited to environmental justice communities.

***Information Requested:*** OSTP has considered definitions for sustainable chemistry to potentially include incorporating technology, policy, finance/economics, energetics, national security, critical industries, and critical natural resources. OSTP encourages input on these and other considerations for a definition of sustainable chemistry. Respondents may provide information for **one or as many topics** below as they choose. Through this RFI, OSTP seeks information to develop a consensus definition for the term “sustainable chemistry” and to consider the implications of such a definition, including the following topics:

1. *Definition of sustainable chemistry:* OSTP is mandated by the 2021 NDAA to develop a consensus definition of sustainable chemistry. Comments are requested on what that definition should include. The definition will inform OSTP and Federal agencies for prioritizing and implementing research and development programs to advance sustainable chemistry practice in the United States. Comments are also requested on how the definition of “sustainable chemistry” relates to the common usage of “green chemistry” and whether these terms should be synonymous, exclusive, complementary, or if one should be incorporated into the other.
2. *Technologies that would benefit from Federal attention to move society toward more sustainable chemistry:* What technologies/sectors stand to benefit most from progress in sustainable chemistry or require prioritized investment? Why? What mature technology areas, if any, should be lower priority?
3. *Fundamental research areas:* What fundamental and emerging research areas require increased attention, investment, and/or priority focus to support innovation toward sustainable chemistry (e.g., catalysis, separations, toxicity, biodegradation, thermodynamics, kinetics, life-cycle analysis, market forces, public awareness, tax credits, etc.). What Federal research area might you regard as mature/robustly covered, or which Federal programs would benefit from increased prioritization?

Ancillary topics regarding the definition:

4. *Potential outcome and output metrics based on the definition of sustainable chemistry:* What outcomes and output metrics will provide OSTP the ability to prioritize initiatives and measure their success? How does one determine the effectiveness of the definition of sustainable chemistry? What are the quantitative features characteristic of sustainable chemistry?

5. *Financial and economic considerations for advancing sustainable chemistry:* How are financial and economic factors considered (e.g., competitiveness, externalized costs), assessed (e.g., economic models, full life cycle management tools) and implemented (e.g., economic infrastructure).
6. *Policy considerations for advancing sustainable chemistry:* What changes in policy could the Federal government make to improve and/or promote sustainable chemistry?
7. *Investment considerations when prioritizing Federal initiatives for study:* What issues, consequences, and priorities are not necessarily covered under the definition of sustainable chemistry, but should be considered when investing in initiatives? Public Law 114-329, discussed in the background section above, includes the phrase: “*support viable long-term solutions to a significant number of challenges*”. OSTP expects the final definition of sustainable chemistry to strongly consider resource conservation and other environmentally focused issues. For example, national security, jobs, funding models, partnership models, critical industries, and environmental justice considerations may all incur consequences from implementation of sustainable chemistry initiatives such as dematerialization, or the reduction of quantities of materials needed to serve and economic function.

Dated: March 30, 2022.

**Stacy Murphy,**

*Operations Manager.*

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